

MINING ENGINEERING INDEX TO VOLUME 22

January-December 1970

Published by the Society of Mining Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc.

PART I. Feature Articles

A

Abel, John F.: <i>The Mining Engineer: He Stands Out</i> (Career Series) Mar	43
Acoustic Drying of Ultrafine Coal: H. V. Fairbanks	Dec 49
Acquire First, Explore Last: William C. Peters	Nov 75
Agarwal, R. K., and Boshkov, Stefan: <i>Theory and Practice Gap Closes in Rock Mechanics</i>	Feb 74
Agglomeration: also see Pelletizing	
annual review	Feb 108
flocculation of nonmagnetic taconites	Nov 79
Aggregates	
annual review	Jan 67
AIME Stands Firm on Continental Shelf	May 82
Ames, John A.: <i>Cement</i>	Jan 52
AMMI Sarda	
Masua mine and concentrator	Oct 75
Anaconda Co., The	
hydraulic tailing fill improvements at Butte	Aug 70
Twin Buttes operation	Apr 51
Anglo American Corp.	
introduces mid-shaft sinking-loading at Vaal Reefs South gold mine	Jan 74
Anslow, R. J., and Walker, R.: <i>Unit Trains and Modern Sea Terminals Speed Phosphate Exports</i>	Jan 75
Antipollution Focuses Liquid-Solid Separation on Clarifying, Filtering: C. S. Simons	Feb 105
Aparo, S. J.: <i>Improving Techniques Get More Out of Florida Phosphate</i>	May 76
Aplite	
annual review	Jan 55
Appleyard, F. C.: <i>Gypsum</i>	Jan 57
Arizona	
copper province, influence of Texas lineament on	May 80
Arizona's Copper Province and the Texas Lineament: Jacques B. Wertz	May 80
Asheville Minerals Research Laboratory	
pilot tests, mineral recovery from tailings in North Carolina	Jul 113
Assaying	
Career Series	Feb 13
when to stop sample drilling	Jul 115
with electron-beam microprobe	Jul 120
Assaying—A Profession of Rising Value (Career Series): Harold E. Richard	Feb 13
Autogenous Grinding Around the World: B. S. Crocker	Aug 80
Autogenous Grinding Picks Up Speed	Sep 76
Automation: also see Computers, Control, Instruments, Process Control	
at Anaconda's Twin Buttes concentrator	Apr 51
in lead and zinc plants	Oct 75

B

Bader, John W.: <i>When to Stop Drilling</i>	Jul 115
Banner Mining Co.	
exploration and mining in Twin Buttes district	Apr 51
Barite	
annual review	Jan 47

Bastnasite	
annual review	Jan 47
Batcha, J. P. Jr., and Denny, J. Robert: <i>Newmont Computers Pay Off in Mine Planning</i>	Nov 65
Battery-Powered Equipment in Deep Mining: E. D. Slone and F. L. Dillard	Sep 74
Bauxite	
annual review	Jan 49
exploration in Indonesia	Aug 53
Beall, John V.: <i>Indonesia</i>	Aug 53
Beall, John V.: <i>Thailand</i>	Jul 100
Beck, James A.: <i>Potash</i>	Jan 64
Bell & Zoller Coal Co.	
use of battery-powered haulage equipment at Zeigler Mine	Sep 74
Belter, J. W., and Ellman, R. C.: <i>Bigger Markets Mean More Preparation for Lignite and Subbituminous Coal</i>	Mar 47
Bentonite	
annual review	Jan 51
Berg, William A.: <i>How to Promote Plants in Mine Wastes</i>	Nov 67
Bethlehem Steel Corp.	
materials handling at Burns Harbor plant	Jun 73
Bigger Markets Mean More Preparation for Lignite and Subbituminous Coal: R. C. Ellman and J. W. Belter	Mar 47
Bishop, Freeman: <i>Budget Quake Rocks the Interior</i>	Aug 72
Bleiherger Bergwerks Union	
process for lead smelting, battery-scrap treatment	Oct 75
Bluemel, A. C., Harper, J. S. Jr., and Jett, J. H.: <i>The New Generation in Advanced Transportation Systems</i>	Jun 67
Boliden Co.	
Laisvall mine, comparison of rod and pebble milling at	Oct 75
Bolt, Beranek and Newman	
noise control symposium	Mar 50
Boron	
annual review	Jan 52
Boshkov, Stefan, and Agarwal, R. K.: <i>Theory and Practice Gap Closes in Rock Mechanics</i>	Feb 74
Botbol, Joseph Moses: <i>A Model Way to Analyze the Mineralogy of Base Metal Mining Districts</i>	Mar 56
Bottom Ash	
annual review	Jan 56
Breitling, T. O.: <i>Mill Designers Zero in on Environmental Control</i>	Feb 96
Bright Future Eyed for Utilization of Coal: Norman Yarborough	Feb 113
Brown, Severn P.: <i>Burgeoning Exploration Activity Highlights Metal Mining Geology in 1969</i>	Feb 77
Bruce, William E.: <i>How to Predict the Penetration Rate of Percussive Drills</i>	Nov 62
Brunswick Mining and Smelting Corp.	
concentrator modifications	Oct 75
Bucketwheel Excavators and Their Potential in the Mineral Industry: W. L. Price	Jun 71
Budget Quake Rocks the Interior: Freeman Bishop	Aug 72
Buie, B. F.: <i>Kaolin</i>	Jan 58
Bunker Hill Co.	
underground mining system at Kellogg, Idaho	Oct 75
Bunting, R. F., and Shrode, R. S.: <i>The Importance of Transportation to the Minerals Industry</i>	Jun 60
Burgeoning Exploration Activity Highlights Metal Mining Geology in 1969: Severn P. Brown	Feb 77

C

Caldwell, A. Blake: <i>Ertzberg—A Gigantic Base Metal Outcrop</i>	Aug 56
Caldwell, A. Blake: <i>Twin Buttes—Anaconda's Concept for Mining and Processing A Low-Grade Copper Ore</i>	Apr 51
Campbell, Robert E.: <i>Geophysical Exploration Moves Ahead on Two Planets</i>	Feb 82
Canada	
copper resources and production	Apr 67
mining tax incentives, proposed cancellation of	Nov 69
mining taxes in	Sep 82
Canadian Electrolytic Zinc Ltd.	
Lurgi roasters at	Oct 75
Cannon, Joseph G.: <i>Bastnasite</i>	Jan 47
Career Series	
assaying	Feb 13
exploration	Jan 26
milling	Apr 25
mining	Mar 43
Carpenter, Robert H.: <i>USGS Leads in the Maturing Science of Geochemical Exploration</i>	Feb 88
Caterpillar Tractor Co.	
analyzes shop vs. dealer repair costs	Jul 110
Celestite	
annual review	Jan 52
Cement	
annual review	Jan 52
Cerro de Pasco Corp.	
Paragsha concentrator	Oct 75
Chemical Processing	
annual review	Feb 106
Chirones, W. J., and Price, L. A.: <i>New Design Concepts for Electric Mining Shovels</i>	Mar 52
Chile	
copper resources and production	Apr 67
Classification: see Cycloning, Sizing	
Clean Water From Coal Mines: G. C. Smith, H. E. Steinman and E. F. Young, Jr.	Jul 118
Coal	
bituminous, impact of air pollution regulations on	Aug 67
carbonization for synthetic crude with Lurgi-Ruhrgas retorting process	Sep 63
lignite and subbituminous, new preparation processes for improving	Mar 47
mine drainage, cleaning of	Jun 118
spoils, planting in	Nov 67
transport, by unit train	Jun 64
Coal Mining	
surface, auger and underground, at Consol's Rowland mine	May 65
underground, use of battery-powered haulage equipment in	Sep 74
Coal Preparation	
at Consol's Rowland mine	May 65
bituminous, for sulfur reduction	Aug 67
processes to upgrade lignite and subbituminous coal	Mar 47
sonic drying of ultrafines	Dec 49
Coal Utilization	
annual review	Feb 113
lignite and subbituminous coals, use in power plants	Mar 47
Coda, Frank M.: <i>Perlite</i>	Jan 62
Cominco American, Inc.	
Magmont mine	Oct 75

Comminution: also see Crushing, Grinding
at Anaconda's Twin Buttes operation Apr 51

Computers
hiring engineers by Jul 112
in mine planning and ore reserve determination Nov 65
use in analyzing mineralogy of base metal mining districts from binary occurrence model Mar 56
use in exploration, mining and milling Apr 74
use in simulation studies to size open-pit fleets Dec 41
Computers and Operations Research: A Decade of Progress and a Look Toward the Future: L. Michael Kaas Apr 74
Computers Head Parade in Process Control Advances: W. F. McDermott Feb 111
Concentration: also see Flotation; Liquid-Solid, Magnetic Separation
annual review Feb 102
high-tension electromagnetic, at Wabush Mines Dec 33
improved by electron-beam microprobe Jul 120
lead and zinc Oct 75

Congo
copper production and resources Apr 67

Conservation: see Environmental Control

Consolidation Coal Co.
Rowland mine May 65

Continental Oil Co.
solution mining of potash Jul 106

Control: also see Automation, Instruments, Process Control
radio remote, in railroads Jun 65
thyristors in Harnischfeger electric shovels Mar 52

Converting
elimination of, in process to extract copper from chalcocite Nov 71

Conveying
belt Jun 69
Serpentix Jun 67

Copper
Ertzberg mine, Freeport Indonesia, Aug 56
exploration in Indonesia Aug 53
extraction from chalcocite without matte smelting and converting Nov 71
mineralization, Arizona, influence of Texas lineament on May 80
resources, prices, production, consumption Apr 67
Twin Buttes mine Apr 51
Copper Resources in 1970 (1970 Jackling Lecture): J. David Lowell Apr 67
Cost of Transporting Ores and Raw Materials in World Markets. The: Phillip J. Maddex and Ole Skaarup Jun 56

Costs: also see Economics
cut at Pine Point by radial tires Oct 75
exploration Oct 75
freight, cut by unit trains Jun 64
lead and zinc production Oct 75
of acquiring land for exploration Nov 75
of byproduct recovery from industrial mineral tailings Jul 113
of disposal well systems Aug 62
of Grad computerized placement Jul 112
of Lurgi-Ruhrgas retorting Sep 63
of optimum truck-and-shovel fleet, technique for calculating Dec 41
railroad, cut by radio remote control Jun 65
reduced by total transportation Jun 58
repair, shop vs. dealer Jul 110
shipping, role of traffic manager in saving Jun 62
shotcrete, Hecla Mining Co. May 69
transport, ore and raw material Jun 56
tunneling, laser vs. conventional guidance systems May 74
Crocker, B. S.: Autogenous Grinding Around the World Sep 80
Crocker, L. George, D. R. and Rosenbaum, J. B.: The Recovery of Elemental Sulfur From Base Metal Smelters Jan 75

Crushing
annual review Feb 99
mobile stations Jun 77
of phosphate, for end uses May 78
Crushing and Grinding Practices Vary But Autogenous Grinding Continues to Gain Adherents: Bertrand Robinson Feb 99

Cycloning
for byproduct recovery from industrial mineral tailings Jul 113

D

Davis, J. G., and Shock, D'Arcy A.: Solution Mining of Thin Bedded Potash Jul 106
Denny, J. Robert, and Batcha, J. P. Jr.: Neumont Computers Pay Off in Mine Planning Nov 65
Deshmukh, S. S.: Sizing of Fleets in Open Pits Dec 41
Desliming
of nonmagnetic taconites Nov 79
phosphate, Florida May 76

Det Norske Zinkkompani
zinc residue treatment process Oct 75
Dettmer, Philip B.: How to Pick a Million-Dollar Grinding Machine Sep 77
Developments in Solution Mining Portend Greater Use for In Situ Leaching: D'Arcy A. Shock Feb 73

Dewatering: see Drying, Mine Water Control

Diatomite
annual review Jan 54
Dillard, F. L., and Stone, E. D.: **Battery-Powered Equipment in Deep Mining** Sep 74

Dimension Stone
annual review Jan 55
Disposal Wells Are A Worthwhile Risk: J. L. Wright Aug 62
Distribution of Groundwater U-O₂ on the Colorado Plateau: Richard V. Wyman Dec 39

Dolomite
annual review Jan 59
Dosmond, P.: **Load and Carry Machines and Portable Crushing Plants Improve Underground Productivity** Jun 77
Dowis, John E.: Mining Tax Variations in North America Sep 82

Drainage: see Mine Water Control

Dredging
for tin, Thailand Jul 100

Drilling
percussive, prediction of penetration rate in Nov 62
sample, determining when to stop Jul 115

Drying
acoustic, of ultrafine coal Dec 49
spray, at Anaconda's Twin Buttes concentrator Apr 51

E

Economics: also see Costs, Government Mineral Policy
coal reserves, production and consumption Aug 67
continental shelf May 82
copper resources, prices, production, consumption Apr 67
effect of taxes on mining ventures in U.S., Canada and Mexico Sep 82
effects of Canadian mining tax incentives Nov 69
engineering salaries, basis for Apr 77
geophysical exploration expenditure, free world, in 1968 Mar 63
industrial minerals production and consumption Dec 46
investment vs. probability of success in exploration Aug 64
of advanced transportation systems Jun 67
of mine planning with computers Nov 65
of rail transportation Jun 60
of total transportation Jun 58
of transportation Jun 56

Eestail Mining Ltd.
plans for underground mining at Kidd Creek Oct 75

Education
factors influencing extractive metallurgy enrollment May 53
in Indonesia Aug 53

Electrolytic Processing
of zinc Oct 75
Ellman, R. C., and Belter, J. W.: **Bigger Markets Mean More Preparation for Lignite and Subbituminous Coal** Mar 47
Emigh, G. Donald: Phosphate Jan 62
Engineering Sparks Progress in Minerals Concentration: A. D. Kennedy and L. W. Trainor Feb 102

Environmental Control: also see Health, Safety, Waste Disposal and Use
air pollution regulations for coal Aug 67

cleaning of acid drainage from coal mines Jul 118
elemental sulfur recovery from smelter stack gases Jan 75
in lead and zinc production Oct 75
landscaped tailings dikes, Anaconda's Twin Buttes mine Apr 51
mine waste handling by belt conveyor Jun 69
noise, industrial, control of Mar 50
planting in mine wastes Nov 67
water reuse in nonmagnetic taconite flotation Nov 79

Equipment: listed under type or application
Ertzberg—A Gigantic Base Metal Outcrop: A. Blake Caldwell Aug 56
Expanding World of Mineral Transport, The Jun 55

Exploration: also see Geochemistry, Geology, Geophysics, Surveying
acquisition of land for Nov 75
aided by electron-beam microprobe Jul 120
annual review Feb 77
Career Series Jan 26
computer use in ore reserve determination Nov 65
geophysical, free world, in 1968 Mar 63
in Indonesia Aug 53
in Ireland Sep 67
investment, relation to survival Aug 64
lead and zinc Oct 75
method of analyzing mineralogy of base metal mining districts Mar 56
offshore, Thailand Jul 100
porphyry copper Apr 67
sample drilling, when to stop Jul 115
use of computers and operations research in Apr 74
Exploration Philosophy—Top to Bottom (Career Series): Ora H. Rostad Jan 26

F

Fairbanks, H. V.: Acoustic Drying of Ultrafine Coal Dec 49

Feldspar
annual review Jan 55
recovery from tailings Jul 113
Fine, M. M., and Schluter, R. B.: Processing Pelletized Cu Concentrate Nov 71

Flocculation: see Agglomeration

Flotation
for byproduct recovery from industrial mineral tailings Jul 113
lead and zinc Oct 75
nonmagnetic taconite, reuse of water in Nov 79
phosphate, Florida May 76

Fluorspar
annual review Jan 56
mining, Thailand Jul 100

Fly Ash
annual review Jan 56
Framework for Decisions, A: Brian W. Mackenzie Aug 64
Freeman, William G.: Barite Jan 47

Freeport Sulphur Co.
Ertzberg development, West Irian, Indonesia Aug 56
Frommer, D. W.: **Nonmagnetic Taconites** Nov 79

Fuller's Earth
annual review Jan 51
Funk, R. M., and Lawver, J. E.: **High-Tension Electrostatic Separation for Making Iron Ore Superconcentrates** Jan 71

G

Geochemistry: also see Exploration
annual review Feb 88

Geological Engineering
annual review Feb 80

Geology: also see Exploration, Geochemistry, Geophysics, Surveying
of Anaconda's Twin Buttes deposit Apr 51
of porphyry copper deposits Apr 67
of Wabush Mines deposit Dec 33
origin of uranium and other metal deposits in Colorado Plateau Dec 39
relation of lineaments to mineralization Oct 75
Texas lineament, influence on Arizona copper province May 80
Geophysical Activity Surges in the Western World: Peter Hood Mar 63

Geophysical Exploration Moves Ahead on Two Planets: Robert E. Campbell	Feb	82
Geophysics: also see Exploration		
annual review	Feb	82
free world activity in 1968	Mar	63
George, D. R., Crocker, L., and Rosenbaum, J. B.: The Recovery of Elemental Sulfur From Base Metal Smelters	Jan	75
Gibson, C. R.: Titanium	Jan	69
Gibson, C. R.: Zircon and Hafnium	Jan	70
Gibson, J. Douglas: Mining Tax Incentives Are Good for Canada	Nov	69
Government Mineral Policy		
air pollution regulations for coal	Aug	67
Canada, mining tax incentives	Nov	69
continental shelf	May	82
effect on copper mining, exploration, prices	Apr	67
in Indonesia	Aug	53
in Ireland	Sep	67
in Thailand	Jul	100
mining taxes in U.S., Canada and Mexico, comparison	Sep	82
noise control legislation	Mar	50
proposed cut in Interior research Aug state tax allowances for water pollution control	Aug	62
Grad System, The	Jul	112
Grancher, Roy A.: Lime, Limestone, and Dolomite	Jan	59
Grinding		
annual review	Feb	99
autogenous, at Freeport Indonesia	Sep	76
Ertzberg project	Aug	56
of phosphate, for end uses	May	78
wet autogenous, at Wabush Mines	Dec	33
Ground Control: also see Rock Mechanics		
determining slope stability with tiltmeter	Sep	71
shotcrete, use in ground and stope support, shaft linings	May	69
Groundwater: see Hydrology		
Gypsum		
annual review	Jan	57
processing, for end uses	May	78
H		
Hafnium		
annual review	Jan	70
Hammer, E. J.: Processing Gypsum for End Use Markets	May	78
Harnischfeger Corp.		
design of P&H Model 2800 electric mining shovel	Mar	52
Harper, J. S. Jr., Bluemel, A. C. and Jett, J. H.: The New Generation in Advanced Transportation Systems	Jun	67
Harrell, Don L. Jr., and McCarl, Henry N.: Structural Mineral Aggregates	Jan	67
Hartley, D.: Radio Remote Control Devices Cut Costs and Enhance the Safety of Railroads	Jun	65
Haulage: see Conveying, Materials Handling Systems, Transportation		
Health: also see Environmental Control		
effects of industrial noise	Mar	50
Heath Steele Mines Ltd.		
profits from close-spaced drilling	Oct	75
Heavy-Media Separation		
lead and zinc	Oct	75
Hecla Mining Co.		
experience with shotcrete	May	69
Helt, Wilbur C.: Fly Ash and Bottom Ash	Jan	56
Hendricks, R. S.: Shotcrete Gives Stronger Support at Lower Cost	May	69
High-Tension Separation		
electrostatic, for making iron ore superconcentrates	Jan	71
High-Tension Electrostatic Separation for Making Iron Ore Superconcentrates: J. E. Lawver and R. M. Funk	Jan	71
Highlights for Underground Mining		
Are Ground Control, Trackless Equipment and Boring Machines: Austin Park	Feb	69
Highlights—World Symposium on the Mining and Metallurgy of Lead and Zinc	Oct	75
Hood, Peter: Geophysical Activity Surges in the Western World	Mar	63
How Much Repairs Really Cost	Jul	110

How to Make Money On Minerals Reclaimed From Tailings: Immo H. Redeker	Jul	113
How to Pick a Million-Dollar Grinding Machine: Philip B. Dettmer	Sep	77
How to Predict the Penetration Rate of Percussive Drills: William E. Bruce	Nov	62
How to Promote Plants in Mine Wastes: William A. Berg	Nov	67
Hurley, F. E.: Lithium	Jan	60
Hydraulic Tailing Fill Improvements—Butte-1969: Harold F. Yde, Jr.	Aug	70
Hydrology: also see Geology, Mine Water Control, Water		
annual review	Feb	90
influence of groundwater on uranium deposition in Colorado Plateau	Dec	39
studies to protect water supply at New Jersey Zinc mine, Elmwood, Tenn.	Oct	75
Hydrometallurgical Processing of lead and zinc	Oct	75
I		
Impact of Air Pollution Regulations on Coal: T. Reed Scollon	Aug	67
Importance of Transportation to the Minerals Industry. The: R. S. Shrode and R. F. Bunting	Jun	60
Improving Techniques Get More Out of Florida Phosphate: S. J. Aparo	May	76
Indonesia		
mineral activity in	Aug	53
Indonesia: John V. Beall	Aug	53
Industrial Minerals		
annual review	Jan	46
industry, products, markets, output and growth	Dec	46
tailings, byproduct recovery from Jul transportation of	Jun	113
Industrial Minerals Are Big Business: Charles H. Kline	Dec	46
Industrial Minerals of 1969—Their Status, Challenge and Future	Jan	46
Industrial Noise Is Deafening	Mar	50
Instruments: also see Automation		
electron-beam microprobe	Jul	120
infrared, for detecting loose rock	Nov	59
laser guidance for tunneling	May	74
tiltmeter for detecting rotational ground movement	Sep	71
Ireland		
mining industry incentives, exploration and production in	Sep	67
Irish Base Metals Ltd.		
Tynagh mine and concentrator	Oct	75
Irish Mining Renaissance, The: Thomas J. O'Neill	Sep	67
Iron		
mining, concentrating and pelletizing at Wabush Mines	Dec	33
nonmagnetic taconite, water reuse in experimental flotation of	Nov	79
ore and pellet handling at Bethlehem Steel Burns Harbor plant	Jun	73
ore handling underground	Jun	77
ore superconcentrates, production by high-tension electrostatic separation	Jan	71
removal from acid mine water	Jul	118
Robe River project, Western Australia	Aug	74
J		
Jackling Lecture		
Copper Resources in 1970: J. David Lowell	Apr	67
Jeffrey Mfg. Co.		
battery-powered 404-H Ramcar	Sep	74
Jett, J. H., Harper, J. S. Jr., and Bluemel, A. C.: The New Generation in Advanced Transportation Systems	Jun	67
Jones & Laughlin Steel Corp.		
corrects coal mine drainage pollution	Jul	118
K		
Kaas, L. Michael: Computers and Operations Research: A Decade of Progress and a Look Toward the Future	Apr	74
Kadey, F. L. Jr.: Diatomite	Jan	54
Kaolin		
annual review	Jan	58

Kennecott Copper Corp.		
research with electron-beam microprobe	Jul	120
Kennedy, A. D., and Trainor, L. W.: Engineering Sparks Progress in Minerals Concentration	Feb	102
Kiln Products Ltd.		
treats complex mix in Waelz kiln	Oct	75
Kistler, Robert B.: Boron	Jan	52
Kline, Charles H.: Industrial Minerals Are Big Business	Dec	46
Kyanite		
annual review	Jan	58
L		
Lake Dufault Mines, Ltd.		
handles varying mill feed with automatic control	Oct	75
Land Acquisition		
for exploration	Nov	75
Laser—An Economic Guide To Straight Tunneling: W. C. Schafer	May	74
Lasers: see Instruments		
Lawver, J. E., and Funk, R. M.: High-Tension Electrostatic Separation for Making Iron Ore Superconcentrates	Jan	71
Leaching		
study of solution migration with electron-beam microprobe	Jul	120
Lead		
highlights, 1970 World Symposium	Oct	75
Lefond, Stanley J.: Salt	Jan	68
Legislation: see Government Mineral Policy		
Levitsky, Serge L.: Sulfur	Jan	68
Lime		
annual review	Jan	59
Limestone		
annual review	Jan	59
Liquid-Solid Separation		
annual review	Feb	105
Lithium		
annual review	Jan	60
Load and Carry Machines and Portable Crushing Plants Improve Underground Productivity: P. Desmond	Jun	77
Load-Haul-Dump		
use of in Missouri lead belt	Oct	75
Loading: also see Shovels		
coal, enhanced by control	Jun	64
mid-shaft sinking-loading concept Jan rail car, at Wabush Mines	Dec	33
underground ore	Jun	77
with bucketwheel stacker-reclaimers	Jun	71
Loose Rock Can Be Detected by Infrared Devices: Robert H. Merrill and Raymond M. Statham	Nov	59
Lowell, J. David: Copper Resources in 1970 (1970 Jackling Lecture)	Apr	67
Lynch, Dean W.: Mining Developments Around the World Indicate a Strong Copper Expansion	Feb	61
M		
Mackenzie, Brian W.: A Framework for Decisions	Aug	64
MacPherson, A. R.: Mills in Revolution	Sep	76
Maddex, Phillip J.: Total Transportation—The Key to Lower Delivered Costs	Jun	58
Maddex, Phillip J., and Skaarup, Ole: The Cost of Transporting Ores and Raw Materials in World Markets	Jun	58
Magnesium Compounds		
annual review	Jan	60
Magnetite		
Ertzberg mine, Freeport Indonesia, West Irian	Aug	56
Maintenance		
at Robe River project, Western Australia	Aug	74
fault detection system, Harnischfeger P&H Model 2800 electric mining shovel	Mar	52
shop vs. dealer repair costs	Jul	110
system at Anaconda's Twin Buttes mine	Apr	81
Management		
acquiring land for exploration	Nov	75
computers in mine planning	Nov	65

determining shop vs. dealer repair costs	Jul	110
engineering salary considerations	Apr	77
formulas for decisions in mining	Aug	64
Grad computerized placement system	Jul	112
in industrial minerals production	Dec	46
personnel policies	May	53
traffic	Jun	62
Manganese		
mining, Thailand	Jul	100
Many-Fingered Microprobe, The: J. D. Stephens and R. W. Wittkopp	Jul	120
Marketing		
of industrial minerals	Dec	46
Materials Handling Systems		
advanced, pipeline, rail and conveyor	Jun	67
at Anaconda's Twin Buttes mine	Apr	51
at Bethlehem Steel Burns Harbor plant	Jun	73
at Consol's Rowland coal mine	May	65
at Robe River project	Aug	74
at Wabush Mines	Dec	33
for phosphate	Jun	75
for shotcrete	May	69
in underground mines	Jun	77
open-pit truck-and-shovel, techniques for selecting	Dec	41
McCarl, Henry N., and Harrell, Don L. Jr.: Structural Minerals Aggregates	Jan	67
McDermott, W. F.: Computers Head Parade in Process Control Advances	Feb	111
McGee, J. P.: Dimension Stone	Jan	55
Meisel, George M.: Why Milling Men Prefer Giants	Sep	78
Merrill, Robert H., and Stateham, Raymond M.: Loose Rock Can Be Detected by Infrared Devices	Nov	59
Mexico		
mining taxes in	Sep	82
Mica		
annual review	Jan	61
recovery from tailings	Jul	113
Mid-Continent Coal and Coke Co.		
cuts freight costs with unit trains	Jun	64
Mill Designers Zero in on Environmental Control: T. O. Breitling	Feb	96
Mill Men See Growing Applications for Chemical Processing: R. S. Rickard	Feb	106
Miller, Jan D.: Size Analysis and Flotation Chemistry Highlighted by Basic Science Researchers	Feb	92
Milling—A Career of Multiple Choices (Career Series): Norman Weiss	Apr	25
Mills in Revolution: A. R. MacPherson	Sep	76
Mine Design		
at Ertsberg, Freeport Indonesia, West Irian	Aug	56
for lead and zinc orebodies	Oct	75
Twin Buttes copper pit	Apr	51
with computer techniques	Nov	65
Mine Water Control		
cleaning acid coal mine drainage	Jul	118
Mineral Processing		
annual review	Feb	92
at Anaconda's Twin Buttes mine	Apr	51
Career Series	Apr	25
potash, selection of system for	Mar	60
Minerals Beneficiation in '69 Steps up Tonnage Engineering, Environmental Control and Automation	Feb	92
Mining; also see Offshore, Solution, Surface, Underground Mining; Mining Methods; unit operations		
Career Series	Mar	43
Mining Developments Around the World Indicate a Strong Copper Expansion: Dean W. Lynch	Feb	61
Mining Engineer: He Stands Out, The (Career Series): John F. Abel	Mar	43
Mining Methods		
at Ertsberg, Freeport Indonesia, West Irian	Aug	56
at Wabush Mines	Dec	33
hydraulic tailing fill in deep mines	Aug	70
in lead and zinc mines	Oct	75
mid-shaft sinking-loading	Jan	74
potash solution mining	Jul	106
surface, at Anaconda's Twin Buttes mine	Apr	51
use of battery-powered haulage equipment underground	Sep	74
Mining Tax Incentives Are Good for Canada: J. Douglas Gibson	Nov	69

Mining Tax Variations in North America: John E. Dowis	Sep	82
Mining Turns Its Research Muscle on the Development of New Concepts for Material Handling	Feb	61
Missouri Lead Belt		
mines, operation and comparative productivity of	Oct	75
Mitchell, J. B.: Three Ways to Process Potash	Mar	60
Mitsubishi Mining Co. Ltd.		
Akita electrolytic zinc plant	Oct	75
Model Way to Analyze the Mineralogy of Base Metal Mining Districts, A: Joseph Moses Bothol	Mar	56
Montgomery, Gill: Domestic Fluorspar in 1969	Jan	56
Moses, John H.: Bauxite	Jan	49
Moulder, E. A.: Water Pollution Control Creates Demand for Groundwater Hydrologists	Feb	90
Mount Isa Mines Ltd.		
expansion program	Oct	75
treatment of carbonaceous lead and zinc ores	Oct	75
Mulryan, H. T.: Talc, Soapstone and Pyrophyllite	Jan	69
N		
Nepheline Syenite		
annual review	Jan	55
New Design Concepts for Electric Mining Shovels: L. A. Price and W. J. Cherones	Mar	52
New Generation of Belt Conveyors, The: A. T. Yu	Jun	69
New Jersey Zinc Co.		
fluid-column roasting, Depuy, Ill.	Oct	75
water conservation, Elmwood, Tenn.	Oct	75
New Mexico		
Carlsbad Basin, potash solution mining in	Jul	106
New Mid-Shaft Sinking-Loading Concept	Jan	74
Newmont Computers Pay Off in Mine Planning: J. Robert Denny and J. P. Batcha, Jr.	Nov	65
Newmont Mining Corp.		
uses computers in mine planning and ore reserve determination	Nov	65
Nickel		
exploration in Indonesia	Aug	53
Nicol, Alan B., and Parry, W. T.: A Tiltmeter to Measure Minute Rotational Movement	Sep	71
Niemitz, V.: Versatility Highlights Bethlehem Steel Corp.'s Material Handling Equipment at Burns Harbor	Jun	73
Nisso Smelting Co., Ltd.		
Aizu plant	Oct	75
Nonmagnetic Taconites: D. W. Frommer	Nov	79
New Generation in Advanced Transportation Systems, The: J. S. Harper, Jr., A. C. Bluemel and J. H. Jett	Jun	67
O		
Offshore Mining		
of tin, Thailand	Jul	100
rights, continental shelf	May	82
Oil Shale		
retorting for synthetic crude with Lurgi-Ruhrgas process	Sep	63
One Process Retorts Three Feeds for Synthetic Crude: Roland W. Rammner	Sep	63
O'Neill, Thomas J.: The Irish Mining Renaissance	Sep	67
Open-Pit Mining; see Surface Mining		
Operations Research		
analysis of shop vs. dealer repair costs	Jul	110
computer use in mine planning and ore reserve determination	Nov	65
determining relation of exploration investment to success	Aug	64
determining tax effects on mine feasibility with discounted cash flow analysis	Sep	82
determining when to conclude sampling in ore reserve estimates	Jul	115
technique for sizing open-pit truck-and-shovel fleet	Dec	41
techniques applied to exploration, mining and milling	Apr	74
total transportation	Jun	58
underground transport	Jun	77

P		
Park, Austin: Highlights of Underground Mining Are Ground Control, Trackless Equipment and Boring Machines	Feb	69
Parry, W. T., and Nicol, Alan B.: A Tiltmeter to Measure Minute Rotational Movement	Sep	71
Patterson, Sam H.: Bentonite and Fuller's Earth	Jan	51
Pelletizing		
iron ore, at Wabush Mines	Dec	33
Robe River plant, Western Australia	Aug	74
Penarroya, Société Minière et Metallurgique de		
Imperial Smelting process at Noyelles-Godault works	Oct	75
lead and zinc concentrators	Oct	75
Perlite		
annual review	Jan	62
Peru		
copper resources and production	Apr	67
Peters, William C.: Acquire First, Explores Last	Nov	75
Petroleum		
production and exploration, in Indonesia	Aug	53
synthetic crude production, Lurgi-Ruhrgas retorting process for	Sep	63
Phosphate		
annual review	Jan	62
Florida, processing techniques for	May	76
transport of	Jun	75
Pine Point		
radial tires cut costs at	Oct	75
Pipelines		
for Ertsberg project, Freeport Indonesia, West Irian	Aug	56
Hydrohoist	Jun	67
Plant Design		
annual review	Feb	96
Ertsberg project, Freeport Indonesia, West Irian	Aug	56
for Lurgi-Ruhrgas synthetic crude retorting process	Sep	63
high-tension electrostatic separation, for iron ore superconcentrates	Jan	71
lead and zinc	Oct	75
noise control measures	Mar	50
potash processing, factors in	Mar	60
Robe River, Western Australia	Aug	74
Potash		
annual review	Jan	64
processing of	Mar	60
solution mining of	Jul	106
Power Generation		
coal requirements for	Aug	67
shovel drive, Harnischfeger P&H Electrodrive compared with conventional Ward Leonard	Mar	52
with char from Lurgi-Ruhrgas coal carbonization	Sep	63
Price, L. A., and Cherones, W. J.: New Design Concepts for Electric Mining Shovels	Mar	52
Price, W. L.: Bucketwheel Excavators and Their Potential in the Mineral Industry	Jun	71
Process Control		
annual review	Feb	111
at Ertsberg project of Freeport Indonesia	Aug	56
Processing Gypsum for End Use Markets: E. J. Hammer	May	78
Processing Pelletized Cu Concentrate: M. M. Fine and R. B. Schluter	Nov	71
Public Works Create Great Demand for Geological Engineering Services: D. H. Yardley	Feb	80
Pumping		
for disposal wells	Aug	62
Purcell, Geoffrey: Sabbatical Soundings (Opinion)	May	53
Pyrolysis		
annual review	Feb	108
copper extraction from chalcocite without matte smelting and converting	Nov	71
Pyrolysis and Agglomeration Trends Dominated by Pelletizing, Metallized Agglomerates Growing: D. M. Ulrich	Feb	108
Pyrometallurgical Processing		
of lead and zinc	Oct	75
Pyrophyllite		
annual review	Jan	69

Quarries		
recovery from tailings	Jul	113

Radio Remote Control Devices Cut Costs and Enhance the Safety of Railroads: D. Hartley	Jun	65
Railroads		
industrial minerals transport	Jun	60
radio remote control for	Jun	65
unit-train transport of coal	Jun	64
Rammner, Roland W.: <i>One Process Reverts Three Feeds for Synthetic Crude</i>	Sep	63

Reclamation: see Environmental Control		
Recovery of Elemental Sulfur From Base Metal Smelters, The: D. R. George, L. Crocker and J. B. Rosenbaum	Jan	75
Redeker, Immo H.: <i>How to Make Money On Minerals Reclaimed From Tailings</i>	Jul	113

Reduction		
in copper extraction from chalcocite without matte smelting and converting	Nov	71
Reeves, J. A.: <i>Unit Trains Help Mid-Continent Coal and Coke Co. Cut Freight Costs</i>	Jun	64

Refining		
byproduct recovery from slimes with aid of electron-beam microprobe	Jul	120

Refractories		
annual review	Jan	66

Research		
acoustic drying of ultrafine coal	Dec	49
copper extraction from chalcocite without matte smelting and converting	Nov	71
development of binary occurrence model for analyzing base metal mining districts	Mar	56
elemental sulfur recovery process for smelter stack gases	Jan	75
geophysical, free world, in 1968	Mar	63
high-tension electrostatic separation to produce iron ore superconcentrates	Jan	71
infrared detection of loose rock	Nov	59
Interior Department, proposed cuts in	Aug	72
mineral, with electron-beam microprobe	Jul	120
on byproduct recovery from industrial mineral tailings	Jul	113
on potash solution mining	Jul	106
on treating acid coal mine drainage	Jul	118
pilot studies of Lurgi-Ruhrgas retorting process for synthetic crude production	Sep	63
predicting penetration rate of percussive drills	Nov	62
slope stability studies with tiltmeter	Sep	71
water reuse in nonmagnetic taconite flotation	Nov	79

Retorting		
Lurgi-Ruhrgas process for synthetic crude production	Sep	63
Ribe, A. M.: <i>The Traffic Manager and His Role in Saving Shipping Costs</i>	Jun	62
Richard, Harold E.: <i>Assaying—A Profession of Rising Value (Career Series)</i>	Feb	13
Rickard, R. S.: <i>Mill Men See Growing Applications for Chemical Processing</i>	Feb	106

Roasting		
desulfurization, to extract copper from chalcocite without matte-smelting and converting	Nov	71
zinc	Oct	75

Robe River Ltd.		
iron ore mining and pelletizing project, Western Australia	Aug	74
Robinson, Bertrand: <i>Crushing and Grinding Practices Vary But Autogenous Grinding Continues to Gain Adherents</i>	Feb	99

Rock Mechanics: also see Ground Control		
annual review	Feb	74
Rosenbaum, J. B., George, D. R., and Crocker, L.: <i>The Recovery of Elemental Sulfur From Base Metal Smelters</i>	Jan	75
Rostad, Ora H.: <i>Exploration Philosophy—Top to Bottom (Career Series)</i>	Jan	26

Rowland—A Workable Approach to Mining Coal: Robert P. Sisselman	May	65
--	-----	----

Sabbatical Soundings (Opinion): Geoffrey Purcell	May	53
---	-----	----

Safety		
infrared detection of loose rock	Nov	59
landslide prediction with tiltmeter	Sep	71
railroad, enhanced by radio remote control	Jun	65

St. Joseph Lead Co.		
Fletcher and Viburnum mines	Oct	75
Fletcher mill	Oct	75

Salt		
annual review	Jan	66
Schafer, W. C.: <i>Laser—An Economic Guide To Straight Tunneling</i>	May	74

Schluter, R. B., and Fine, M. M.: <i>Processing Pelletized Cu Concentrate</i>	Nov	71
Seollon, T. Reed: <i>Impact of Air Pollution Regulations on Coal</i>	Aug	67

Separation: see Heavy-Media, High-Tension, Liquid-Solid Separation		
---	--	--

Shaft Sinkers Pty. Ltd.		
mid-shaft sinking-loading method	Jan	74

Shaft Sinking		
mid-shaft sinking-loading concept	Jan	74
use of shotcrete lining in	May	69
Shock, D'Arcy A.: <i>Developments in Solution Mining Portend Greater Use for In Situ Leaching</i>	Feb	73
Shock, D'Arcy A., and Davis, J. G.: <i>Solution Mining of Thin Bedded Potash</i>	Jul	106
Shotcrete Gives Stronger Support at Lower Cost: R. S. Hendricks	May	69

Shoveling, Shovels		
electric mining, Harnischfeger P&H Model 2800	Mar	52
selection by computer and simulation techniques	Dec	41
Shrode, R. S., and Bunting, R. F.: <i>The Importance of Transportation to the Minerals Industry</i>	Jun	60
Simons, C. S.: <i>Antipollution Focuses Liquid-Solid Separation on Clarifying, Filtering</i>	Feb	105
Sisselman, Robert P.: <i>Rowland—A Workable Approach to Mining Coal</i>	May	65
Size Analysis and Flotation Chemistry Highlighted by Basic Science Researchers: Jan D. Miller	Feb	92

Sizing		
gypsum, for end uses	May	78
phosphate flotation feed	May	76
Sizing of Fleets in Open Pits: S. S. Deshmukh	Dec	41
Skaarup, Ole, and Maddex, Phillip J.: <i>The Cost of Transporting Ores and Raw Materials in World Markets</i>	Jun	56
Slone, E. D., and Dillard, F. L.: <i>Battery-Powered Equipment in Deep Mining</i>	Sep	74

Smelting		
copper, aided by electron-beam microprobe	Jul	120
gases, production of elemental sulfur from	Jan	75
lead and zinc	Oct	75
of copper pellets with lime	Nov	71
tin, in Thailand	Jul	100
Smith, Arthur R.: <i>Magnesium Compounds</i>	Jan	60
Smith, G. C., Steinman, H. E., and Young, E. F. Jr.: <i>Clean Water From Coal Mines</i>	Jul	118

Soapstone		
annual review	Jan	69

Solution Mining		
annual review	Feb	73
of thin bedded potash	Jul	106
Solution Mining of Thin Bedded Potash: J. G. Davis and D'Arcy A. Shock	Jul	106
Stateham, Raymond M., and Merrill, Robert H.: <i>Loose Rock Can Be Detected by Infrared Devices</i>	Nov	59

Statistics		
Canadian mineral production	Nov	69
industrial minerals production and consumption	Dec	46
lead and zinc production	Oct	75
production, 1967-1969	Feb	118
production, Thailand	Jul	180

Steinman, H. E., Smith, G. C., and Young, E. F. Jr.: <i>Clean Water From Coal Mines</i>	Jul	118
Stephens, J. D., and Wittkopp, R. W.: <i>The Many-Fingered Microprobe</i>	Jul	120

Stolberger Zinc A.G.		
battery-lead reclaiming process	Oct	75

Stoping		
in lead and zinc mines	Oct	75
use of shotcrete support in	May	69

Storage and Reclamation		
bucketwheel stacker-reclaimers	Jun	71
coal	Jun	64
of low-rank coals	Mar	47
of phosphate	Jun	75

Sulfur		
annual review	Jan	68
elemental, technique for producing from smelter gases	Jan	75
in coal, reduction of	Aug	67

Surface Mining: also see Mine Design, Mining Methods		
annual review	Feb	61
at Robe River project, Western Australia	Aug	74
at Wabush Mines	Dec	33
determining slope stability with tiltmeter	Sep	71
methods and equipment, at Anaconda's Twin Buttes mine	Apr	51
of lead and zinc	Oct	75
selection of truck-and-shovel fleet	Dec	41

Surveying		
geophysical, free world, in 1968	Mar	63
Sweeney, John W.: <i>Kyanite and Related Minerals</i>	Jan	58

Tailing		
fill, hydraulic, in deep mines	Aug	70
industrial mineral, byproduct recovery from	Jul	113

Tale		
annual review	Jan	69

Tar Sand		
retorting for synthetic crude with Lurgi-Ruhrgas process	Sep	63

Taxation: see Government Mineral Policy		
Teague, Kefton H.: <i>Feldspar, Apatite, and Nepheline Syenite</i>	Jan	55

Thailand		
mining, exploration and mineral production in	Jul	100
Thailand: John V. Beall	Jul	100
Theory and Practice Gap Closes in Rock Mechanics: R. K. Agarwal and Stefan Boshkov	Feb	74
\$300-Million Robe River Project Off the Ground	Aug	74
Three Ways to Process Potash: J. B. Mitchell	Mar	60
Tiltmeter to Measure Minute Rotational Movement, A: W. T. Parry and Alan B. Nicol	Sep	71

Tin		
exploration in Indonesia	Aug	53
mining and production in Thailand	Jul	100

Tires		
radial, cut costs at Pine Point	Oct	75

Titanium		
annual review	Jan	69
Total Transportation—The Key to Lower Delivered Costs: Phillip J. Maddex	Jun	58
Traffic Manager and His Role in Saving Shipping Costs, The: A. M. Ribe	Jun	62
Trainor, L. W., and Kennedy, A. D.: <i>Engineering Sparks Progress in Minerals Concentration</i>	Feb	102

Transportation: also see Conveying, Loading, Materials Handling Systems, Pipelines		
for Robe River project, Western Australia	Aug	74
of phosphate	Jun	75
of Wabush Mines iron concentrate	Dec	33
ore and raw material, cost of	Jun	56
problems in handling low-rank coals	Mar	47
rail, of industrial minerals	Jun	60
railroad, radio remote control in	Jun	65
systems, total	Jun	58
traffic manager's role in	Jun	62
underground, with battery-powered haulage equipment	Sep	74
unit-train, of coal	Jun	64

Treadwell Corp.		
cyanide process for copper	Apr	51

Trepea lead and zinc roasters Oct	75	United States Department of the Interior proposed budget cuts Aug	72	Water Pollution Control Creates Demand for Groundwater Hydrologists: E. A. Moulder Feb	90
Tracks: also see Materials Handling Systems, Transportation selection by simulation Dec	41	USGS Leads in the Maturing Science of Geochemical Exploration: Rob- ert H. Carpenter Feb	88	Weiss, Norman: <i>Milling—A Career of Multiple Choices</i> (Career Series) Apr	25
Tsumeb Corp. Ltd. copper-lead-zinc concentrator Oct	75	United States Steel Corp. rail transport control at Minntac mine Jun	65	Wert, Jacques B.: <i>Arizona's Copper Province and the Texas Linea- ment</i> May	80
Tunneling laser guidance system for May	74	Uranium deposit formation in Colorado Plateau Dec	39	What is Experience Worth? Apr	77
Twin Buttes—Anaconda's Concept for Mining and Processing A Low- Grade Copper Ore: A. Blake Caldwell Apr	51	Urich, D. M.: <i>Pyrolysis and Agglomera- tion Trends Dominated by Pel- letizing, Metallized Agglomer- ates Growing</i> Feb	108	When to Stop Drilling: John W. Bader Jul	115
U					
Underground Mining: also see Coal Min- ing, Ground Control, Mine Des- ign, Mining Methods, Shaft Sinking, Tunneling annual review Feb	60	V			
Unit Trains and Modern Sea Terminals Speed Phosphate Exports: R. J. Anslow and R. Walker Jun	75	VanHorn, Earl C.: <i>Mica</i> Jan	61	Why Milling Men Prefer Giants: George M. Meisel Sep	78
Unit Trains Help Mid-Continent Coal and Coke Co. Cut Freight Costs: J. A. Reeves Jun	64	Versatility Highlights Bethlehem Steel Corp.'s Material Handling Equipment at Burns Harbor: V. Niemitz Jun	73	Wicken, O. M.: <i>Higher Quality Refrac- tories</i> Jan	66
United States copper resources, production, prices consumption Apr	67	Vieille-Montagne, Société des Mines et Fonderies de Zinc Balcan electrolytic zinc plant Oct	75	Wittkopp, R. W., and Stephens, J. D.: <i>The Many-Fingered Microprobe</i> Jul	120
United States Bureau of Mines detection of loose rock with infrared devices Nov	59	W			
develops process to extract copper from chalcocite without matte smelting and converting Nov	71	Wabush—A \$300-Million Iron Operation Dec	33	Wright, J. L.: <i>Disposal Wells are a Worthwhile Risk</i> Aug	62
Grand Forks Coal Research Labora- tory, research in lignite prepa- ration Mar	47	Walker, R., and Anslow, R. J.: <i>Unit Trains and Modern Sea Termi- nals Speed Phosphate Exports</i> Jun	75	Wyman, Richard V.: <i>Distribution of Groundwater U₃O₈ on the Colo- rado Plateau</i> Dec	39
method for predicting penetration rate of percussive drills Nov	62	Y			
pilot tautic flotation process, water reuse in 79	79	Yarborough, Norman: <i>Bright Future Eued for Utilization of Coal</i> Feb	113	Z	
predicted world and U.S. copper con- sumption Apr	67	Yardley, D. H.: <i>Public Works Create Great Demand for Geological Engineering Services</i> Feb	80	Zambia copper production and resources Apr	67
proposed budget cuts Aug	72	Yde, Harold F. Jr.: <i>Hydraulic Tail- ing Fill Improvements—Butte—1969</i> Aug	70	Zambia Broken Hill Development Co. eliminates ringing in Waelz kiln Oct	75
Salt Lake City Metallurgy Re- search Center develops techn- ique for recovering elemental sulfur from smelter gases Jan	75	Young, E. F. Jr., Smith, G. C., and Steinman, H. E.: <i>Clean Water From Coal Mines</i> Jul	118	Zinc highlights, 1970 World Symposium Oct	75
		Yu, A. T.: <i>The New Generation of Belt Conveyors</i> Jun	69	Zircon annual review Jan	70

PART II. Industry News

A					
AEC predicts nuclear power will fall short in 1980 Sep	22	Amax subsidiary suspending uranium mining operations Feb	6	Armco studies feasibility of Australian fe project Aug	18
AEC to reduce price on californium- 252 Oct	20	Amax to construct aluminum sheet- rolling plant in Rumania Dec	10	Asarco and Anaconda announce pb-zn-ag payment plans Nov	10
AEC will cut uranium purchases May	22	American Cyanamid, Union Camp in titanium venture Oct	36	Asarco and Phelps Dodge in pilot plant project Sep	24
Affinity Mining created by Eastern Coal Dec	12	American Medical Assn., HEW join to check on miners' pneumo- coniosis May	16	Asarco contemplates developing Cana- dian copper site May	25
Alaska pipeline—probe permafrost effects Mar	10	American Nuclear, Humble finalize U ₃ O ₈ exploration pact Jun	37	Asarco enters into cu agreement with Earth Resources Sep	35
Alaskan beryllium, tin potential Jun	22	American Zinc halts production Nov	12	Asarco Mexicana will develop Mexico's largest cu find to date Mar	6
Alcan Aluminum doubling smelter capacity Jun	6	Anaconda and Asarco announce pb-zn-ag payment plans Nov	10	Asarco mining concession canceled by Peru Dec	12
Alcan Aluminum expansion Jul	22	Anaconda completes transfer of cu holdings to Chilean government Feb	10	Asarco, Phelps Dodge test sulfur process May	22
Alcan New Zealand expanding May	36	Anaconda cuts back at Great Falls Aug	23	Atlas Explorations locates significant cu/mo deposit Oct	32
Alcoa alumina plant goes to Costa Rica Jul	34	Anaconda developments Sep	24	Australian gold dredging May	28
Alcoa announces largest al unit-train order Jul	40	Anaconda ends Laguna dispute May	37	Australian International reports Tumby Bay cu find Jun	28
Alcoa offers air pollution device to aluminum industry Mar	6	Anaconda expands in Butte, Montana May	28	Australian mineral outlook May	27
Alcoa will construct ship unloading facility in Va. Jul	44	Anaconda finds Utah copper Jul	62	Austrian steel producer expanding pro- duction Jun	15
Allied Chemical and Gulf Oil to pro- cess used nuclear fuel Apr	16	Anaconda is sharing its profits with Chilean government Apr	4	Avco gasdynamic laser—industrial ap- plications Jul	16
Allis-Chalmers loaders come to the aid of Republic Steel Apr	18	Anaconda ore crusher for Berkeley pit Sep	8	B	
Allis Chalmers' tractor is off assembly line Aug	9	Anaconda plans improving Montana copper smelter Mar	6	Bamangwato and Amax reach nickel matte pact Jun	28
Alumina plant for Europe Jun	5	Anaconda rebuilding Raritan copper refinery Jul	26	Barringer Research emphasizes Fijian exploration for copper and oil Jul	24
Aluminum demand in Japan to double in five years Jun	34	Anaconda will have ore crushing facil- ity built by Ferguson Jan	10	Barringer Research receives oil con- cession off Fiji Islands Jun	32
Aluminum piping in coal mines Nov	12	Anaconda Australia indicates more nickel at Widgemoor Feb	6	Battelle-Northwest fabricating prometh- ium pellets Jul	40
Aluminum shortage seen May	27	Anglo American and Trans-Natal dis- cuss new coal area Jul	62	Battelle-Northwest finds ion bombard- ment cheaper Dec	10
Alusuisse cancels al project Jun	22	Anglo American worldwide prospecting program Jul	31	Battelle-Northwest process improves steel, strength Jun	37
Amax agrees to acquire remaining share in Roan Selection Trust Apr	4	Antimony demand spurs reevaluation of pine creek land Jun	28	Bechtel power frequency project advancing to construction stage May	37
Amax announces \$500-million coal sales pact Oct	32	Anvil Mining dedicates Yukon's large pb-zn-ag find Mar	6	Benilite announces ilmenite benefi- ciation Jul	42
Amax describes Australian bauxite project Jul	16	Arctic Gold achieves good results in ni leaching Jun	18	Bethlehem in exploration program May	36
Amax and Bamangwato reach nickel matte pact Jun	28	Arctic oil submarine goes into drydock Apr	18		
Amax increases appropriations for Henderson project Jul	62	Argentine iron ore project Jul	20		
Amax, Japanese reach molybdenum agreement Dec	12				

Bolivia creates state monopoly to market minerals	Jan	10
Boston Edison will test sulfur recovery method	Sep	18
Botswana's Pkwe-Selebi project	May	24
Bougainville copper flotation order goes to Denver Equipment	Jul	42
Boyd of Copper Range talks to security analysts	Aug	16
Bramedia Resources indicates large Canadian cu-mo find	Feb	10
Brazil supplying fe to Japanese	Jun	12
British Columbia and Yukon Territory: new mines were originally discovered by prospectors	Sep	35
British Columbia, possibility of a smelter	May	25
Broken Hill and Inco of Australia sinking shaft at Widgeemooltha Mar	6	
Broken Hill South finds added phosphate deposits	May	15
Broken Hill to explore Ontario cu-au claims	Dec	8
Brown & Root awarded major contract by Falconbridge Dominicana	Jan	10
Brush Beryllium to supply parts for Poseidon program	Nov	11
Bucyrus-Erie dragline for Utah Development	Aug	23
Bullion Monarch announces antimony agreement with Dowco Mining	Nov	11
Bullion Monarch readies antimony mine for reopening	May	32

C

C&K Coal acquired by Gulf Resources & Chemical	Feb	26
Cadillac and Penarroya together in Northwest Territories	Apr	16
Calaveras Cement is modernizing San Andreas plant	Jun	15
Canada-dawn of the age of mammoth mines	Oct	30
Canada's new si source	May	35
Canadian Javelin planning new iron ore project	Nov	11
Canadian Pacific-Cominco investigate world coal markets	Jun	18
Cassiar Asbestos expands	May	35
Cerro de Pasco's Casapalca mine is draining via Gratton Tunnel	Apr	4
Cerro and Frontier Resources in joint venture	May	32
Cerro cu deposits optioned by European-South African consortium	Jul	40
Cerro sells copper mine to Ranchers Exploration	Jan	14
Cerro's Rio Blanco begins production	Sep	14
Cerro's Rio Blanco project reported on schedule	May	16
Chile attempts small mine expansion program	Jun	18
Chile netted \$2.3 billion	Nov	36
Chile's new marxist president wants total nationalization	Oct	15
Chile seeks to expand its small, medium cu mines	Sep	16
Chilean-Rumanian ore pact	May	22
Cities Service contemplates sinking shaft at copper site	Feb	24
Cities Service may sink Arizona cu shaft	Jun	22
Cleveland-Cliffs denies Robe River commitment	Apr	5
Cleveland-Cliffs, Getty and Skelly find Wyoming U.Os	Sep	30
Cleveland-Cliffs' Sherman mine expands	May	37
Cliffs Victory opens Cleveland 1970 iron ore shipping season	Jun	37
Climax mine wins citation for preventing water pollution	Sep	30
Coal export curbs sought	Sep	12
Coal miners may get SBA help to meet safety requirements	Jul	24
Coal Research office argues over proposed budget	Jun	34
Coal safety regulations causing unrest in industry	Nov	11
Cominco-Canadian Pacific investigate world coal markets	Jun	18
Cominco and National Lead in joint exploration program	May	16
Cominco to explore New Bedford's sturgeon lake property	Sep	24
Congo copper developments	May	15
Consol awarded contract for low-sulfur fuel process	Nov	17
Consolidated Mayflower and Norris Oil in Colombia	Jul	62
Continental Gummiwerke awarded conveyor contract	Feb	16
Conzinc Rintinto will sell Himet fe to Japan	May	22
Copperfields reports interesting cu mineralization	Jun	39
Copper profit of \$48 million realized U.S. government	Jul	4
Copperfields Mining co project	Sep	12
Costa Rica will get Alcoa alumina plant	Jul	34

Court denies RST motion	Nov	20
Cyprus Mines announces sales boost in Goldworthy fe ore	Apr	18
Cyprus-Utah affiliate gets \$113-million contract	Oct	36
Cyprus-Utah affiliate's \$83 million sale of fe sands	Jul	34

D

Dahomey: UN seeks to build up geology and mining expertise	Nov	34
Denison Mines concludes \$300 million contract with Japanese	Apr	20
Denver Equipment division administrative offices destroyed	Apr	16
Denver Equipment gets Bougainville copper flotation order	Jul	42
Dillingham offers to acquire Canmore Mines	Nov	26
Dillingham subsidiary acquires rights from Murphysore	Jun	35
Dowa of Japan finds ore	Dec	12
Dowa of Japan loans \$1.3 million	May	37
Dowco Mining announces antimony agreement with Bullion Monarch	Nov	11
Draft lottery and engineers	Jun	32
Dravo developments	Jul	20
Dravo fe concentrating-pellet plant is on stream	Feb	24
Dravo of Australia begins Robe River construction	Dec	14
Dravo to construct coal beneficiation system	Jul	44
Dupont of Canada, Lacanex Mining negotiate joint venture	May	16

E

Eagle-Picher closes zinc mine	Dec	10
Eagle-Picher producing Kansas zinc	Jul	34
Earth Resources cu development	Feb	26
Earth Resources enters into cu agreement with Asarco	Sep	35
Earth Resources mine and mill	Apr	21
Earth Resources sells coal mine	Jun	31
Earth Resources subsidiary sells Alaska coal facilities	May	36
Eastern Coal creates Affinity Mining	Dec	12
Eastern Coal in methane drainage program	Aug	14
Ecuador being surveyed for cu	May	22
Eisenhower ag dollar will increase government revenue	Jun	5
El Teniente copper purchased by Japanese	Jul	22
El Teniente—production and progress in 1969	Mar	10
Enerdyne finds U.Os in Ambrosia lake vicinity	Jun	32
Envirotech finalizes purchase of McKee's Wemco Division	Mar	10
Ernest Orlando Lawrence memorial award	Aug	23
European-South African consortium options Cerro cu deposits	Jul	40
Exotech and Smith International explore new mining process	Feb	6
Export-import bank financing artificial island terminal	Nov	12

F

FMC claims a commercial future for project COED	Apr	12
FMC says coal conversion process produces high yield crude oil	Apr	12
Falconbridge Dominicana awards Brown & Root major contract	Jan	10
Falconbridge in South Africa platinum venture	Oct	20
Falconbridge ni supply vs demand will soon balance	Nov	10
Falconbridge to triple ni production by 1975	Jun	5
Falconbridge will triple ni deliveries by 1975	Aug	5
Federal Resources exercises option on Faraday's uranium property	May	36
Federal Resources finds high grade cu vein	Jul	65
Ferguson awarded engineering contract	Mar	10
Ferguson to build ore crushing facility for Anaconda	Jan	10
Fertilizer producers have good year	Sep	35
Finland's Outokumpu Oy	May	32
Flintkote Division constructing limestone slurry pipeline	Apr	20
Fluor Utah Engineers subsidiary named coal mine concentrator	Jun	37
FMC dedicates new coal conversion plant	Nov	10
FMC drillers thread needle's eye in Wyoming	Jul	56
France: One of the largest drying plants in the world	Nov	34
Freeport developments	Aug	14
Freeport Kaolin expands capacity 25%	Jul	65
Freeport signs sales contracts on Indonesian copper project	Feb	10

Freeport Sulphur gets remaining Irian copper financing	May	27
Freeport will build ni-cu pilot plant in Louisiana	May	16
Frontier Resources and Cerro in joint venture	May	32

G

GM testing lunar wheel design	Jun	31
Gasoline from coal—cost projections improve	Jun	31
General Dynamic plans giant submarine tankers for Arctic oil	Apr	12
General Electric creates gem-quality diamonds	Aug	5
Getty, Cleveland-Cliffs, Skelly find Wyoming U.Os	Sep	30
Goldfields mine to close	May	28
Gove Peninsula all deposits waiting to be tapped	Jun	5
W. R. Grace signs exploration agreement with Silver Bell	Feb	16
Greenwater Copper and Wyoming Nuclear	Jun	36
Groote Eylandt manganese deposits of Australia	Jun	12
Grangesberg acquires share in Canadian copper mine	Jan	10
Guardian mines to drill promising geophysical targets on ag-cu property	Jun	37
Gulf Design awarded major engineering contract by Kaiser	Jun	37
Gulf Minerals contemplates uranium mill	Jun	32
Gulf Oil and Allied Chemical to process used nuclear fuel	Apr	16
Gulf Oil plans \$50-million uranium project in Canada	Oct	25
Gulf Resources & Chemical acquires C&K Coal	Feb	26
General Motors develops process for reclaiming scrap steel	Apr	5
General Nuclear sells uranium claims to Getty Oil	Jul	44
Getty Oil purchases uranium claims from General Nuclear	Jul	44
Gridoil shareholders pave way for Ashland Oil Canada Ltd.	Oct	15

H

Hammersley Iron Pty. Ltd. lifts Kaiser's 1969 earnings	Mar	9
Hammersley's new expansion plans	Apr	21
Hanna agrees to nickel venture with Colombia	Oct	20
Hanna Coal opening new mine	May	32
Hanna Mining will get Brazilian holding company	Dec	10
Hanna negotiates for Colombian nickel	Jul	34
Hanna will export nickel from Colombia	Sep	8
Harvey in major titanium expansion	May	16
HEW, American Medical Assn. join to check on miners' pneumoconiosis	May	16
Hickel calls environmental conference for September	Jun	34
Hickel calls for proposals on coal mine health projects	Dec	6
Hickel signs land freeze modification order	Feb	26
Humble, American Nuclear finalize U.Os exploration pact	Jun	37
Humble Oil gives Newport News super-tanker contract	Jun	18
Humble Oil plans uranium mine and mill in Wyoming	Apr	16
Hungary bauxite production increasing with 5 year plan	Jul	22
Hungary fertilizer contract awarded to Wellman-Lord	Jul	40

I

Ilmenite beneficiation announced by Benilite Corp.	Jul	42
Inco and Magellan discuss nickel processing	Jun	34
Inco Canada expanding Clarabelle mine	Jul	26
Inco in Guatemala	Oct	25
Inco is constructing new milling and concentrating facility	Jan	8
Inco mobile sand-conditioning plant processes 2400 tpd flux	Apr	20
Inco of Australia and Broken Hill sinking shaft at Widgeemooltha	Mar	6
Inco report to Cominac recommends pacific ni project	Aug	12
Inco subsidiary continues Australian search	Jul	42
Inco ups prices on exported primary nickel	Dec	8
Inco's expansion progresses as new kirkwood mine opens	Oct	35
India copper find	May	35
Indian copper project	Jul	26
Indian lead-copper project	Jun	12
India's Mangalore fe ore project considered biggest	Apr	4

Indonesian aluminum smelter may be built by Japan	Dec	12
Industrias Penoles finds Mexican ag	Jun	22
Inland Steel grants German firm ammonia license	Sep	22
Inspiration Copper issues pilot plant report	Sep	30
Inspiration Copper testing new SO ₂ removal process	Jun	28
International Nuclear Corp. forms mining subsidiary	Apr	18
Ireco in Australian licensing arrangement	Jul	63
Iron in Alaska	Jun	31
Iron concentrate plant for Chile a first	Feb	6
Iron Ore Co. of Canada announces major expansion	Oct	15
Iron Ore Co. of Canada expands; to spend \$270 million	Dec	6
Island Creek Coal signs big contract with Japanese firm	Feb	16

J

Japan in Katanga	May	22
Japan may build Indonesia aluminum smelter	Dec	12
Japan shows interest in West African bauxite	May	15
Japan to double coke imports	Jun	18
Japanese, Amax reach molybdenum agreement	Dec	12
Japanese being supplied Fe from Brazil	Jun	12
Japanese buy El Teniente copper	Jul	22
Japanese in Peru	Jul	26
Japanese will import New Zealand iron sand	Jul	15
Japan's emerging steel industry	Oct	35
Johannesburg Consolidated in Mozambique	May	21
Johannesburg Investment in South African gold venture	Jul	26

K

Kaiser awards major engineering contract to Gulf Design	Jun	37
Kaiser contract for Australia's largest ore-handling port	Dec	12
Kaiser Engineers awarded contract for Mexican smelter facility	Jul	26
Kaiser Engineers selected for AEC waste repository project	Oct	25
Kaiser into non-ferrous metals	Jun	22
Kaiser, Le Nickel will up nickel production	Aug	14
Kaiser, Pechiney and others talk about alumina plant for Europe	Apr	4
Kaiser reaches agreement over Congolese aluminum smelter	Oct	20
Kaiser seeks more coal	May	19
Kaiser Sunnyside Mine announces coal export to Japan	Jul	42
Kaiser to design and build world's first integrated strontium plant	Jan	14
Kaiser's 1969 earnings lifted by Hamersley Iron Pty. Ltd.	Mar	9
Kaiser Engineers has contract for Sardinha Aluminum plant	Jan	13
Kennecott sampler patent	Jul	77
Kennecott to produce copper at Star Lake in 1971	Aug	9
Kennecott's acquisition of Peabody Coal is approved	May	16
Kennecott's Chino Division wins settlements of safety award	Sep	29
Kennecott's El Teniente undergoes expansion	Sep	12
Kerr Addison carrying out study of Adanac molybdenum property	Jul	44
Kerr-McGee buys Magna Oil's U ₃ O ₈ property	May	35
Kerr-McGee contracts to sell enriched uranium hexafluoride	Jan	10
Kerr-McGee developing Oklahoma coal mine	May	37
Kerr-McGee locates Arizona copper mineralization	Nov	22
Kerr-McGee merger with Vulcan materials	May	32
Kilarney finds coal	Jul	77
Kinofte, new mineral, discovered	Jul	65
Koppers contract to evaluate coal gasification processes	Apr	18

L

Lacanex Mining and Dupont of Canada negotiate joint venture	May	16
La Exotica copper mine to begin operations	Aug	5
Lead-in-gasoline tax may be voted down	Dec	6
Le Nickel, Kaiser will up nickel production	Aug	14
LeTourneau-FMI merger off	Jun	28

M

Madrigal is being backed	May	35
Magellan and Inco discuss nickel processing	Jun	34

Magna's new copper refinery	May	24
Magna Oil's U ₃ O ₈ property is purchased by Kerr-McGee	May	35
Magnetic and gravitational fields of the earth are correlated	Jun	37
Malaysian tin exports grow	Jan	14
Manganese deposits at Groote Eylandt, Australia	Jun	12
Manganese seabed sampling planned	Jun	28
Mapochs millionth ton	Mar	9
Marinduque decides to build \$160 million nickel refinery	Jan	8
Marine Resources Consultants search in Greenland	Nov	17
Mattagami Sturgeon mine will soon produce	Jun	37
Matagami Lake will become producer in three years	Apr	4
McKee construction kiln facilities for U.S. Steel	Jul	62
McKee subsidiary obtain Australian copper contract	Aug	16
McKee's Wemco Division purchase finalized by Envirotech	Mar	10
Metric study enters data gathering phase	Jun	35
Mexican, U.S. scientists begin gulf study	Jul	65
Midland-Ross breaks ground	May	36
Midland-Ross to build, run Japan pellet plant	Dec	17
Midland-Ross will design, supply vertical shaft furnaces	Nov	22
Minbanco says it is partner in asbestos project	Sep	16
Mines bureau sees growing demand for phosphate raw materials	Jan	10
Missouri, University of, new rock cutting technique	Jun	32
Mitsui bauxite mining in the Solomons	Jun	22
Monte Cristo and OTC mine sb in California	Jun	36
Mozambique developments	Jul	26
Mt. Isa plans important move	Jun	6
Murphyores sells rights to Dillingham subsidiary	Jun	35

N

National Lead and Cominco in joint exploration program	May	16
National Lead ilmenite expansion planned in Norway	Jun	15
National Lead's construction expenditure rising in 1970	Mar	9
National Metals, PMC sign cu delivery contract	Jun	32
National Steel is switching to BOF process	May	15
NCA coal traffic annual is available	Oct	35
Nchanga's large-scale cu solvent extraction plant	Aug	23
New Jersey Zinc plans to move personnel	Jul	24
Newport News given supertanker contract by Humble Oil	Jun	18
New Zealand's new al smelter	Jun	22
Ni supply vs demand will soon balance; Falconbridge	Nov	10
Nickel laterite research to continue	May	30
Nickelfields of Australia will develop open pit mine	Sep	30
Nixon compromise on seabed question	Aug	14
Nixon names panel to study copper price rise	Feb	26
Norris Oil and Consolidated Mayflower in Colombia	Jul	62
Norris Oil in joint venture to mine platinum and gold	Jun	36
NSPE establishes registry for unemployed engineers	Dec	12
NSPE reports professional engineers earn median salary of \$16,490 in 1969	Jul	16
NSPE to admit qualified nonregistered engineers	Jul	77

O

Occidental given Sierra Leone oil exploration permit	Oct	32
OTC and Monte Cristo mine sb in California	Jun	36
Offshore Resources gets ocean mining vessel	Aug	12
Ohio Rubber in agreement with Trelleborg	Apr	21
O'Leary, director of USBM resigned, effective March 1, 1970	Apr	4
Ontario carries out geophysical surveying	Jun	34
Ontario's prospecting activity registers upward movement	Mar	9
Osborn is confirmed-will head up USBM	Nov	10

P

Pan American Petroleum awarded contract by Union Camp	Jun	35
Papago Indian reservation is subject of satellite study	Nov	20
Parsons subsidiary studies contract for Mexican copper project	Dec	12

Parsons subsidiary to build facility for Tennessee Copper	Jan	13
Patino interest in New Caledonia	May	30
Peabody Coal acquired by Kennecott	May	16
Peabody signs coal pact	May	19
Pechiney, Kaiser and others talk about alumina plant for Europe	Apr	4
Pechiney may acquire bauxite interest	Nov	12
Peko-Wallsend expands	May	35
Penarroya and Cadillac together in Northwest Territories	Apr	16
Peru advocates stricter government control in Latin America	Jun	34
Peru cancels Asarco mining concession	Dec	12
Peru plans copper refinery—Cajone in jeopardy	Jun	6
Peru reviews unworked concessions	May	15
Peru seeking foreign investment	May	15
Peru's government asking bids for copper refinery	Nov	36
Peruvian decree—U.S. is studying	Jun	5
Phelps Dodge and Asarco in pilot plant project	Sep	24
Phelps Dodge and St. Joseph encounter copper orebody	Jun	36
Phelps Dodge, Asarco test sulfur process	May	22
Phelps Dodge-St. Joseph find Australian copper	May	22
Phelps Dodge's Metcalf mine—construction begins	Jun	22
Philippine law imposing 10% export tax is signed	Jul	20
Pickands Mather commissions study for Fe complex	Dec	17
Pima Mining anticipates production increase	Sep	35
Platinum output in South Africa expected to increase	Aug	6
PMC, National Metals sign cu delivery contract	Jun	32
President Nixon submitted report by Public and Law Commission	Aug	18
Prieska is the scene of major copper-zinc find	Jul	26
Public Land Law review commission submits its report	Sep	18
Public Land Law Commission submits report to President Nixon	Aug	18
Puerto Rico close to copper accord with two U.S. firms	Mar	6

R

Ranchers will develop Idaho antimony property	Feb	10
Ranchers exploration purchases copper mine from Cerro	Jan	14
Republic Steel may produce rare earths	Jun	22
Reynolds adapting new applications for al tubing	Mar	6
Rhodesian activity	May	15
Rio Blanco is expected to begin operation this summer	Aug	9
RioTinto acquisition shakes England's al industry	May	35
Rio Tinto coal	Jun	15
Roan Selection-Botswana ni pact	Jun	12
Roan Selection Trust agrees to acquisition by Amax	Apr	4
Robe River resolved	Jun	12
Rock flow study may aid mine safety	Jun	36
Rogers named chairman new mine appeals board	Jun	35
RST motion denied by US Court	Nov	20
RST requests approval of Zambia takeover	Sep	29
Rumanian-Chilean ore pact	May	22
Rumanian sheet-rolling plant to be constructed by Amax	Dec	10
Russians extending aid	May	15

S

S & S Machinery building \$1 million plant	Dec	10
Sagasca mine given go ahead	May	27
Santa Clara Fe deposits getting concentrator	May	24
Senate committee approves national air quality act	Nov	12
Sewage effluent a plus	Nov	26
Sherbro Minerals modifies African rutile operations	Jun	14
Sherritt Gordon developments	Dec	17
Sherritt Gordon's rutina mine	Dec	15
Sherritt's new copper-zinc mine goes into production	Nov	26
Sierra Leone taking control	May	16
Sileurian Chieftain molybdenum property, developments	May	37
Silica strike in New Zealand	Jan	10
Silver Bell signs exploration agreement with W. R. Grace	Feb	16
Silver Star-Queen property has commercial tungsten	Jun	34
Skelly, Getty and Cleveland-Cliffs find Wyoming U ₃ O ₈	Sep	30
Smith International and Exotech explore mining process	Feb	6

Somali exploration program	Jun	18
Southern Peru signs pact with Peruvian government on Cuzajone	Jan	6
Soviets strengthen al position	Jun	12
Soviets will assist in reopening Burmese tin-tungsten property	Apr	36
Spokane National Mines prepares to work pb, zn, ag mine	Jun	32
SS Manhattan begins second arctic voyage	May	32
St. Joseph and Phelps Dodge encounter copper orebody	Jun	30
St. Joseph-Phelps Dodge find Australian copper	May	22
Standard Metals acquires option	May	37
Standard Metals completes new flotation plant	Apr	16
Standard Metals shows interest in property	Jul	62
Steel expected to grow stronger in this decade	Jul	26
Steel industry cooperates in recycling cans for reuse	Jun	36
Storch Coal Award: nominations for 1971	Dec	17
Sulfur coal shortage will not meet electric demands	Jun	18
Suriname, Reynolds outline aluminum plans	Sep	22
Swindell-Dressler acquires F. C. Torkelson Co.	May	37
Swindell-Dressler gets Kennecott contract for cu recovery	Apr	16

T

TVA awards Fredonia Valley \$½ million pollution contract	Feb	26
Taconite ore waste materials may be utilized in building products	Mar	9
Taconite process looks promising	Jul	56
Tennessee Copper will have facility built by Parsons-Jurden	Jan	13
Terraspaces given water cannon design contract	Aug	6
Texaco leases Utah Shale Land Corp. acreage	May	72
Texas Gulf settles Timmins dispute for \$27 million	Oct	20
Texas Gulf to purchase royal trust interest in part of Kidd Creek Mine	Aug	12
Texas Gulf Sulphur converts to solution mining	Oct	25
Texas Gulf-Timmins case: further court findings	Apr	16
Timet cuts plate price 5%	May	25
Titanium holding steady	Oct	32
Titanium price of tubing makes it more competitive	Jan	10
Titanium process from India	May	32
Titanium production in 1969 peaked to a new high	Apr	16

A

AIME career guidance program	May	85
AIME 1970 President-Elect nomination	Feb	54
AIME Officer Nominees for 1971	Jul	68
AIME Publications:		
AIME World Symposium of Mining & Metallurgy of Lead & Zinc	Oct	65
SME Preprints Annual Meeting 1970	Mar 77, Apr	98
SME Preprints, Fall Meeting 1970	Oct 72, Dec	71
SME Short Course: Bio Extractive Mining	Sep 93, Oct	106
AIME Publication Prices, 1970	Jan	94
Anaconda Co. awards scholarships to University of Arizona students	Apr	94
Around the Sections:		
Jan 83, Feb 120, Mar 74, Apr 100, May 86, Jun 99, Jul 128, Aug 83, Sep 88, Oct 106, Nov 85, Dec		78
Awards:		
James Douglas Gold Medal	Feb	35
Howard N. Eavenson Award	Feb	46
Engineering Achievement Awards	Feb	37
Benjamin F. Fairless Award	Feb	42
Hardinge Award	Feb	44
Jackling Award	Feb	47
Kemp Medal awarded to Carey Cro-nels	Jan	82
1971 Ernest Orlando Lawrence Memorial Award solicitation	Aug	23
Anthony F. Lucas Gold Medal	Feb	37
Mineral Economics Award	Feb	44
Mineral Industry Education Award	Feb	46

Titanium West plans to up production capacity	Nov	26
Toledo Mining will explore three major Dominican properties	Apr	18
Toledo to commence exploratory drilling for cu	Nov	11
Torkelson, F. C. Co. acquired by Swindell-Dressler	May	37
Tosco patents aluminum source recovery process	Jul	62
Tosco says tax reform bill will correct oil inequities	Feb	6
Trans-Natal and Anglo American discuss new coal area	Jul	62
Trelleborg in agreement with Ohio Rubber	Apr	21
Tumby Bay cu find reported by Australian International	Jun	28

U

UN seeks to build up geology and mining expertise in Dahomey	Nov	34
Union Camp, American Cyanamid in titanium venture	Oct	36
Union Camp awards contract to Pan American Petroleum	Jun	35
Union Pacific and Germans explore for uranium	Nov	36
United Uranium NL cu-ag orebody	Jun	34
Uranium and nuclear energy in Australia	Dec	14
USBM announces sampling rules for respirable coal dust	Apr	12
USM head, Osborn, is confirmed	Nov	10
USBM office will help strengthen state-federal relations	Oct	39
USBM reorganizes	Jun	16
USBM reports close of 272 mines in first 10 days of new law	Jul	24
USBM reports on fluidized-bed coal gasification	Jul	34
USBM says steel demand to grow, but at a slower rate	Aug	18
USBM uses DEC computer in black lung disease research	Jul	44
USGS plans nationwide recon for metals in surface water sources	Dec	10
U.S. Steel Amazon fe project	Jun	12
U.S. Steel gets kiln facilities from McKee	Jul	62
U.S. Mexican scientists begin gulf study	Jul	65
U.S. mineral depletion cuts trimmed in final tax bill	Feb	6
U.S. Steel exercises African option	May	19
U.S. Steel subsidiary sees new concentrator for Quebec	Feb	6
U.S. Steel Uncovers Massive iron ore deposits in Nevada	Jan	8
Utah affiliate-Cyprus announce sale of \$83 million in fe sands	Jul	34

Utah coking coal sale to Italy	Nov	36
Utah's available uranium production committed through 1975	Nov	17
Utah Construction & Mining uranium sale	Oct	39
Utah Construction proceeding with Island Copper project	May	15
Utah Construction sells U ₃ O ₈ to West Germany	Apr	16
Utah Construction subsidiary opens Australian coal mine	Jun	18
Utah Development to offer equity participation to Australians	May	30
Utah Mines raises its milling rates	May	35
Utah's Queensland mines to be expanded	Nov	17

V

Vanguard Exploration reports cu high-light of 1969	Jun	32
Vulcan Materials merger with Kerr-McGee	May	32

W

Wellman-Lord awarded Hungary fertilizer contract	Jul	40
Westinghouse to expand zirconium alloy tubing mill	Jul	44
West Virginia has a new coal mine	Mar	10
West Australia nickel	Jun	31
Western Deep Levels constructs new U ₃ O ₈ plant	May	35
Western Titanium of Australia will upgrade ilmenite	May	15
Wyoming Nuclear and Greenwater Copper merge	Jun	36

Y

Youngstown develops titanium-series of steels	Dec	12
Yugoslavia reported planning aluminum smelter	Oct	20
Yukon's large pb-zn-ag find dedicated by Anvil Mining	Mar	6

Z

Zambia abolishes concession rights for two cu companies	Jan	8
Zambia copper mine disaster kills 89; halts production	Dec	6
Zambia's new tax program	Jun	18
Zambia permits six to explore for minerals	May	28
Zambia process will up copper production	Oct	25
Zambia promising mining incentives	Mar	6

PART III. SME News

Robert Peele Memorial Award	Feb	48
Ramsey Gold Medal	Feb	40
Charles F. Rand Gold Medal	Feb	40
Robert H. Richards Award	Feb	42
William Lawrence Saunders Gold Medal	Feb	35
SME Best Presentation Award	Feb	47
Henry H. Storch Award	Feb	122
Student Paper Awards	Mar	76

B

Books:		
Notices		
Jan 78, Feb 124, Mar 67, Apr 97, May 90, Jun 82, Jul 129, Aug 85, Sep 95, Oct 106, Nov 86, Dec		74
Government Publications	Feb 125, Apr 99, Nov	88
State Publications	May 92, Jun 84, Jul	135
Foreign Publications	Oct	108
International Organizations	Oct	108
Bulletins:		
Jan 88, Feb 132, Mar 68, Apr 93, May 96, Jun 95, Jul 142, Aug 90, Sep 96, Oct 110, Nov 94, Dec		84

C

California Institute of Technology receives scholarship fund from Cyprus Mines Corp.	Dec	77
Cerro Corp. gives gift to Colorado School of Mines	Aug	84
Coal Division Officer Nominees, 1971	Jul	72
Colorado School of Mines:		
Announces two appointments to Research Institute	Oct	104
Childs, Orlo E. resigns as president at end of 69-70 school year	Apr	94

Give summer course to school teachers	Sep	92
Offers geochemical exploration course	May	43
Offers summer course in mineral processes	Mar	22
Receives grant from Mobil Foundation	Dec	77
Received \$1.7 million in gifts	Sep	93
Receives gift from Cerro Corp.	Aug	84
Receives grants from Atlantic Richfield Foundation and NSF	Mar	76

Consolidation Coal Co.:		
Establishes scholarships at Virginia Polytech	Jan	81
Gives \$20,000 to West Virginia Colleges	Sep	93
Sets education refund policy for employees	Jul	125

Copper Range Co.:		
Makes contribution to WAAIME scholarship loan fund	Aug	84
Presents grant to Michigan Tech for purchase of X-ray equipment	Sep	92
Council of Economies	Mar 66, Apr	96
Cyprus Mines Corp. gives California Institute of Technology scholarship funds	Dec	77

D

Drift of Things, The:		
Jan 88, Feb 132, Mar 68, Apr 93, May 96, Jun 93, Jul 98, Aug 52, Sep 61, Oct 57, Nov 53, Dec		32

E

Engineers Joint Council:		
Reports decline in engineering student		

enrollments	Jan 82, Jul 125	International Solvent Extraction Conference, 1971	Jan 22	and Yukon Chamber of Mines	Nov 85
Survey shows tight job market no problem to engineering graduates	Nov 84	International Symposium on Digital Computer Applications in Engineering Sciences	May 43	Q	
F		International Symposium on Techniques for Decision Making in the Mineral Industry, 9th	Apr 32	Queen's College sponsors geology field course in Northeast and Canada	Nov 84
Fine Grind:		Joint Engineering Management Conference	Aug 26	Queen's University offers summer course in mineral processes	Mar 22
Jan 35, Feb 49, Apr 43, May 50, Jun 49, Aug 81, Sep 94, Oct 52, Nov	50	Joint Meeting of AIME Central Appalachian Section and West Virginia Coal Mining Institute	Oct 42	R	
Franklin Institute holds explosives seminar	May 43	Mineral Waste Utilization Symposium, 2nd	Jan 20	Rock in the Box:	
G		Mining Environmental Conference, 2nd annual	Mar 12	Jan 32, Feb 50, Mar 34, May 48, Jun 50, Aug 46, Sep 59, Oct 55, Nov 51, Dec	30
Geodata Systems initiates annual field scholarship	Sep 93	National Safety Congress, Coal Mining Section	Oct 41	Royal School of Mines offers postgraduate courses to professional mining engineers	Jan 81
Geophysical Service Inc. gives seismic field systems to eight U.S. and Canadian universities	Apr 94	National Western Mining Conference, 73rd	Jan 20	S	
Golden Gate College institutes M.B.A. program for Bechtel Corp.	Apr 94	North American Fuel Technology Conference	Jan 22	Safeguarding Our Environment:	
I		Northwest Mining Association, 76th Annual Convention	Oct 42	May 61, Jun 52, Jul 36, Aug 25, Sep 60, Oct 49, Nov 48, Dec	28
IndMD Officer Nominees, 1970	Jul 74	Oceanexpo 1971	Dec 22	SME Membership Directory, 1970	Jul 157
In the Aggregate	Mar 30, Jun 31, Aug 80	Offshore Technical Conference, 2nd	Feb 27, Mar 12, Jun 28	SME Officer Nominees, 1971	Jul 70
J		Offshore Technology, 3rd	Aug 28	SME Personnel Service:	
Joy Mfg. Co. awards scholarships	Aug 84	Off-the-Record Meeting	Oct 42	Jan 93, Feb 144, Mar 85, Apr 108, May 104, Jun 102, Jul 148, Aug 96, Sep 106, Oct 121, Nov 100, Dec	88
K		Open Cast Symposium	May 43	Spedden, H. Rush, become 1970 SME President	Mar 5
Kennecott Copper Co.:		Pacific Southwest Mineral Industry Conference, 1970	Apr 30	Stanford University initiates TV instruction for industry	May 85
Awards scholarships	Sep 92	Pacific Southwest Mineral Industry Conference, 1971	Dec 22	T	
Makes scholarship grant to University of Utah	Jul 125	Pan American Federation of Engineering Associations XI Convention	Aug 26	Take Five	May 83, Aug 78, Dec 73
Kinnear, John C. 1970 AIME President	Feb 32	Rare Earth Research Conference, 8th	Jan 20	U	
L		Refractories Symposium, 8th	Mar 22	Union Pacific Foundation gives grants to schools for field trips	Feb 122
Legion of Honor, Class of 1920	Jan 90	SME Fall Meeting 1970	Feb 27, Mar 12, Apr 28, May 38, Jun 39, Jul 80, Aug 25, Sep 39, 45, Oct	University of Alaska offers three mineral education programs	Apr 94
Letters to the Editor:		TUNCON 70, South African Tunneling Conference	May 40	University of Arizona:	
Jan 5, Feb 33, Apr 4, May 6, Jun 4, Jul 6, Aug 4, Oct 9, Dec	4	Western Resources Conference	May 43	Anaconda Co. awards scholarships	Apr 94
M		World Dredging Conference, 3rd	Feb 31	Honors six College of Mines alumni	Aug 84
Mackay School of Mines:		Miami Copper Co.		Miami Copper Co. aids in cooperative education program	Apr 94
Offers courses in environment studies	Oct 104	Aids in cooperative education program at University of Arizona	Apr 94, Oct 104	Receives NSF grant for summer institute program	Feb 122
Receives H.E.W. grant for asbestos study	Feb 122	Employees end education fund drive	Sep 92	University of California offers two short courses in soil mechanics	Feb 31
Sponsors second annual mine field trip for high school students	Aug 84	Sponsors education grants	May 85	University of Minnesota:	
MBD Officer Nominees, 1971	Jul 79	Michigan Technological University:		Explains administrative mergers	Nov 84
M&E Division Officer Nominees, 1971	Jul 76	Honors Australian alumnus	Oct 85	Offers 1st annual Program for Engineering Development	Jan 22
Meetings:		Offers three special courses for mining industry personnel	May 20	Offers short course in rock mechanics at St. John's University campus	May 44
AIME Annual Meeting, 1970	Jan 16, Apr 79	Plans Engineers in Industry program	Mar 20	University of Missouri—Rolla:	
AIME Annual Meeting, 1971	Oct 41, Nov 40, Dec 18	Receives Funds for X-ray equipment	Sep 92	Offers short course in mine health and safety	Feb 31
AIME Centennial Celebration	Jul 91, Sep 40, Nov 40, Dec 18	Mobil Foundation gives grant to Colorado School of Mines	Dec 77	Offers short course in theory of high explosives	Jan 22
AIME International Lead Zinc Symposium	Feb 27, Mar 12, Apr 28, Jun 39, Aug 31, Oct 61	N		University of Utah	
AIME Rapid Excavation Conference	Feb 27, Jun 39, Jul 89, Sep 55, Oct 61	National Council of Engineering Examiners revises publication of state laws and board rules	Dec 77	Establishes new department of geological and geophysical sciences	Feb 122
American Ceramic Society, 73rd Annual Meeting	Nov 45	National Research Council announces postdoctoral research associate-ships	Dec 77	Honors alumni	Mar 85
Canadian Rock Mechanics Symposium, Seventh	Sep 42	Newmont Mining Corp. establishes scholarships for employee dependents	Sep 92	Presents awards to seniors	Jul 125
Clay Minerals Society	May 43	NSF Fellowships, Application deadlines set	Nov 84	Receives scholarship grant from Kennecott	Jul 125
Coal Division annual spring field meeting	Feb 30, Jun 78	O		U. S. Steel Foundation gives \$2,149,700 for education in 1970	Nov 84
Coal Mine Drainage Symposium	Oct 43	Obituaries:		W	
Colorado MBD Subsection Annual Meeting	May 40	Jan 92, Feb 142, Mar 82, Apr 102, May 103, Jun 101, Jul 147, Aug 95, Sep 104, Oct 118, Nov 97, Dec 87		WAAIME:	
Engineering Foundation Research Conferences, 1970	May 40	Opinion	May 53	Copper Range Co. contributes to scholarship fund	Aug 84
Geological Society of America, 83rd Annual Meeting	Aug 26	P		Ladies program for SME Fall Meeting	Sep 39
Illinois Mining Institute, 78th Annual Meeting	Sep 42	Pennsylvania State University:		Washington Survey:	
Industrial Coal Conference, 1970	Apr 31	Offers nuclear explosives course for mining engineers	Mar 76	Jan 31, Feb 52, Mar 25, Apr 39, May 47, Jun 47, Jul 94, Aug 42, Sep 58, Oct 50, Nov 48, Dec	31
Industrial Waste Conference, 25th	Feb 26	Personals:		Westinghouse Electric Corp. forms School for Environmental Management	Apr 94
Instrument Society of America Conference	Mar 20	Jan 80, Feb 134, Mar 78, Apr 104, May 90, Jun 86, Jul 144, Aug 91, Sep 102, Oct 116, Nov 97, Dec 85		West Virginia University	
Inter-American Conference on Materials Technology	Mar 39	Products:		Holds alumni banquet	Dec 77
International Clean Air Congress, 2nd	Sep 39	Jan 84, Feb 126, Mar 71, Apr 88, May 93, Jun 90, Jul 136, Aug 86, Sep 99, Oct 111, Nov 89, Dec 83		Offers coal preparation short course	May 44
International Geochemical Exploration Symposium, 3rd	Jan 20	Prospectors Training Classes offered for 52nd year by British Columbia			
International Geological Congress, 24th, 1972	Feb 31				
International Mining Congress, VI	Apr 32, Aug 78				
International Rock Mechanics Congress, 2nd	May 43				

